



**INDIANA
MICHIGAN
POWER**

A unit of American Electric Power

Indiana Michigan Power
Cook Nuclear Plant
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Bridgman, MI 49106
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November 2, 2020

AEP-NRC-2020-63
10 CFR 50.73

Docket No.: 50-316

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

**Donald C. Cook Nuclear Plant Unit 2
LICENSEE EVENT REPORT 316/2020-003-00**

Manual Reactor Trip and Automatic Safety Injection Due to Failed Open Pressurizer Spray Valve

In accordance with 10 CFR 50.73, Licensee Event Report (LER) System, Indiana Michigan Power Company, the licensee for Donald C. Cook Nuclear Plant Unit 2, is submitting as an enclosure to this letter the following report:

LER 316/2020-003-00: Manual Reactor Trip and Automatic Safety Injection Due to Failed Open Pressurizer Spray Valve

There are no commitments contained in this submittal.

Should you have any questions, please contact Mr. Michael K. Scarpello, Regulatory Affairs Director, at (269) 466-2649.

Sincerely,

K. J. Femeau
Plant Manager

SJM/ml

Enclosure: Licensee Event Report 316/2020-003-00: Manual Reactor Trip and Automatic Safety Injection due to Failed Open Pressurizer Spray Valve

IEZZ
NRR

c: R. J. Ancona – MPSC
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J. B. Giessner – NRC Region III
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Enclosure to AEP-NRC-2020-63

**Licensee Event Report 316/2020-003-00: Manual Reactor Trip and Automatic Safety Injection
Due to Failed Open Pressurizer Spray Valve**



LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<http://www.nrc.gov/reading-m/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to infocollections.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503, e-mail: oira_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. FACILITY NAME Donald C. Cook Nuclear Plant Unit 2					2. DOCKET NUMBER 05000316					3. PAGE 1 OF 4				
4. TITLE Manual Reactor Trip and Automatic Safety Injection Due to Failed Open Pressurizer Spray Valve														
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED					
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME N/A				DOCKET NUMBER 05000	
9	4	2020	2020	003	00	11	02	2020	FACILITY NAME N/A				DOCKET NUMBER 05000	
9. OPERATING MODE			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)											
1			<input type="checkbox"/> 20.2201(b)			<input type="checkbox"/> 20.2203(a)(3)(i)			<input type="checkbox"/> 50.73(a)(2)(ii)(A)			<input type="checkbox"/> 50.73(a)(2)(vii)(A)		
			<input type="checkbox"/> 20.2201(d)			<input type="checkbox"/> 20.2203(a)(3)(ii)			<input type="checkbox"/> 50.73(a)(2)(ii)(B)			<input type="checkbox"/> 50.73(a)(2)(vii)(B)		
			<input type="checkbox"/> 20.2203(a)(1)			<input type="checkbox"/> 20.2203(a)(4)			<input type="checkbox"/> 50.73(a)(2)(ii)			<input type="checkbox"/> 50.73(a)(2)(ix)(A)		
			<input type="checkbox"/> 20.2203(a)(2)(i)			<input type="checkbox"/> 50.36(c)(1)(i)(A)			<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)			<input type="checkbox"/> 50.73(a)(2)(x)		
10. POWER LEVEL 92			<input type="checkbox"/> 20.2203(a)(2)(ii)			<input type="checkbox"/> 50.36(c)(1)(ii)(A)			<input type="checkbox"/> 50.73(a)(2)(v)(A)			<input type="checkbox"/> 73.71(a)(4)		
			<input type="checkbox"/> 20.2203(a)(2)(iii)			<input type="checkbox"/> 50.36(c)(2)			<input type="checkbox"/> 50.73(a)(2)(v)(B)			<input type="checkbox"/> 73.71(a)(5)		
			<input type="checkbox"/> 20.2203(a)(2)(iv)			<input type="checkbox"/> 50.46(a)(3)(ii)			<input type="checkbox"/> 50.73(a)(2)(v)(C)			<input type="checkbox"/> 73.77(a)(1)		
			<input type="checkbox"/> 20.2203(a)(2)(v)			<input type="checkbox"/> 50.73(a)(2)(i)(A)			<input type="checkbox"/> 50.73(a)(2)(v)(D)			<input type="checkbox"/> 73.77(a)(2)(i)		
			<input type="checkbox"/> 20.2203(a)(2)(vi)			<input type="checkbox"/> 50.73(a)(2)(i)(B)			<input type="checkbox"/> 50.73(a)(2)(vii)			<input type="checkbox"/> 73.77(a)(2)(ii)		
						<input type="checkbox"/> 50.73(a)(2)(i)(C)			<input type="checkbox"/> OTHER Specify in Abstract below or in NRC Form 368A					
12. LICENSEE CONTACT FOR THIS LER														
LICENSEE CONTACT Michael K. Scarpello, Regulatory Affairs Director										TELEPHONE NUMBER (Include Area Code) (269) 466-2649				
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT														
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO ICES	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO ICES					
B	AB	PC	MOORE	Y										
14. SUPPLEMENTAL REPORT EXPECTED										15. EXPECTED SUBMISSION DATE		MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO														
ABSTRACT (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines) <p>On September 4, 2020, at 22:04, Unit 2 control room operators completed a planned power reduction from 100 percent to 92 percent reactor power in preparation to perform Main Turbine Stop and Control Valve testing. As Reactor Coolant System (RCS) pressure reached 2235 psig, one of two Pressurizer Spray Valves began to close as expected and the other valve traveled unexpectedly to the fully open position. The operators were unable to close the failed open valve and manually tripped the reactor at 22:42 due to lowering RCS pressure. RCS pressure continued to lower below the safety injection (SI) actuation setpoint and an automatic SI occurred. All safety systems responded as expected and RCS pressure recovered to normal.</p> <p>The cause of the failed open valve was due to foreign material from the control air supply lodged in the positioner spool valve. The valve positioner and electro-pneumatic transmitter were replaced which returned the valve back into service. Planned corrective actions include installing point of use filtration upstream of susceptible valve positioners or replace associated regulating valves to include a filter.</p> <p>This event was reported via Event Notification 54885 in accordance with 10 CFR 50.72(b)(2)(iv)(A), 10 CFR 50.72(b)(2)(iv)(B), and 10 CFR 50.72(b)(3)(iv)(A). This event is reportable as a Licensee Event Report in accordance with 10 CFR 50.73(a)(2)(iv)(A).</p>														



LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

(See NUREG-1022, R.3 for instruction and guidance for completing this form
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Donald C. Cook Nuclear Plant Unit 2	05000316	YEAR	SEQUENTIAL NUMBER	REV NO.
		2020	- 003	- 00

NARRATIVE

EVENT DESCRIPTION

On September 4, 2020, Unit 2 was operating at 100 percent power. The Unit 2 control room operators were preparing to perform Main Turbine Stop and Control Valve [TA][V] testing.

At 16:06, the operators placed the initial set of Pressurizer Backup Heaters [PZR][EHTR] into service in preparation for a planned power reduction to support testing. After the heaters energized, the Pressurizer Spray Valve(s) [AB][FCV] 2-NRV-163 "Reactor Coolant Loop #3 to Pressurizer Spray Control Valve" and 2-NRV-164 "Reactor Coolant Loop #4 to Pressurizer Spray Control Valve" were modulating to control pressurizer pressure.

At 20:35, the operators began to lower reactor power in accordance with 2-OHP-4021-011-001, Attachment 2, Power Reductions Between 89 percent and 100 percent.

At 22:04, operators reported completing the planned power reduction and Unit 2 was stable at 92 percent reactor power.

At 22:37, Pressurizer Spray Valves 2-NRV-163 and 2-NRV-164 closed together as expected in response to a lowering pressurizer pressure.

At 22:38, both Pressurizer Spray Valves began to open upon a valid open signal.

At 22:39, Reactor Coolant System (RCS) pressure reached 2235 psig and 2-NRV-163 began to close, as 2-NRV-164 continued to travel fully open.

At 22:42, the control room received an annunciator, "Pressurizer Pressure Low Deviation Backup Heaters On" and discovered that 2-NRV-164 was fully open with zero percent demand. The operators entered procedure 2-OHP-4022-IFR-001, Instrument Failure Response and determined that 2-NRV-164 could not be closed using control board or digital controls Alarm Log Panel controls. In accordance with procedure immediate actions, operators performed a manual trip of the Unit 2 Reactor [RCT]. The operators entered procedure 2-OHP-4023-E-0, Reactor Trip or Safety Injection. Reactor Coolant Pump(s) (RCP) [AB][P] 23 and 24 were removed from service following verification of E-0 immediate actions. Safety Injection (SI) automatically actuated after RCS pressure lowered below the setpoint. All automatic actions in response to the SI signal occurred as expected.

Following the trip, Unit 2 was supplied by offsite power. All control rods fully inserted. The Auxiliary Feedwater Pumps [BA][P] started and operated, as expected. All Emergency Core Cooling System (ECCS) [BQ] components and Containment Isolation [BD] operated as required. Both Emergency Diesel Generators (EDG) [EK][DG] automatically started and remained in standby. Decay heat was removed by the Condenser Steam Dump Valves [SG][V] and ECCS was secured.



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		2020	- 003	- 00

During SI termination, RCP 22 was removed from service due to continued lowering RCS pressure caused by the failed open pressurizer spray valve 2-NRV-164. Afterward, RCS pressure recovered to normal pressure and remained stable.

The event was reported via Event Notification 54885 in accordance with 10 CFR 50.72(b)(2)(iv)(A), 10 CFR 50.72(b)(2)(iv)(B), and 10 CFR 50.72(b)(3)(iv)(A). The event is reportable as a Licensee Event Report (LER) in accordance with 10 CFR 50.73(a)(2)(iv)(A), for systems that resulted in a manual or automatic actuation of the Reactor Protection System (RPS), Containment Isolation, Emergency Core Cooling (ECCS), Auxiliary Feedwater System (AFW), and Emergency AC Electrical Power Systems.

COMPONENT

2-NRV-164-PU, Reactor Coolant Loop #4 to Pressurizer Spray Control Valve 2-NRV-164 Pneumatic Positioner [AB][PC]

CAUSE OF THE EVENT

Pressurizer spray valve 2-NRV-164 failed open due to debris lodged in the positioner spool valve. No point of use filtration was installed upstream of the spray valve positioner to protect from debris generation downstream of the control air after filter [LF][FLT].

A Root Cause Evaluation (RCE) was in progress at the time this LER was submitted. Any additional insights or causes found to be substantively different as described in this LER will be reported in a supplement at that time.

CORRECTIVE ACTIONS

Completed Corrective Actions

The valve positioner and electro-pneumatic transmitter for 2-NRV-164 was replaced.

Satisfactory diagnostic testing of 2-NRV-164 was completed which returned the valve back into service.

Planned Corrective Actions

Install point of use control air filtration or associated regulating valve with a filter upstream of single point vulnerable valve positioners susceptible to binding caused by small particulate.

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

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ASSESSMENT OF SAFETY CONSEQUENCES**NUCLEAR SAFETY**

There was no actual nuclear safety hazards resulting from 2-NRV-164 failing open, as all safeguard features performed as expected. The potential nuclear safety significance and consequences could have been more severe had the operators not responded as they did or if any of the safety features had not functioned properly.

INDUSTRIAL SAFETY

There was no actual or potential industrial safety hazard resulting from 2-NRV-164 failing open.

RADIOLOGICAL SAFETY

There was no actual or potential radiological safety hazard resulting from 2-NRV-164 failing open.

PROBABILISTIC RISK ASSESSMENT

A Probabilistic Risk Assessment (PRA) was completed. The safety significance of the event was derived by calculating the Conditional Core Damage Probability (CCDP) and the Conditional Large Early Release Probability (CLERP) of the transient initiating event, with the current site Full-Power Internal Events PRA Model of Record. The assessment concluded that the event was of very low safety significance.

PREVIOUS SIMILAR EVENTS

A review of Licensee Event Reports for the past five years found no events due to similar causes.